110TH CONGRESS } HOUSE OF REPRESENTATIVES { REPORT
1st Session } { 110–411

MINE COMMUNICATIONS TECHNOLOGY INNOVATION ACT

OCTOBER 29, 2007.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. GORDON of Tennessee, from the Committee on Science and Technology, submitted the following

R E P O R T

together with

ADDITIONAL VIEWS

[To accompany H.R. 3877]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science and Technology, to whom was referred the bill (H.R. 3877) to require the Director of the National Institute of Standards and Technology to establish an initiative to promote the research, development, and demonstration of miner tracking and communications systems and to promote the establishment of standards regarding underground communications to protect miners in the United States, having considered the same, report favorably thereon with amendments and recommend that the bill as amended do pass.

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69–006

I. AMENDMENT

The amendments are as follows:
Strike all after the enacting clause and insert the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the "Mine Communications Technology Innovation Act".

SEC. 2. FINDINGS.

Congress finds the following:

(1) The failure of miner tracking and communications devices or lack thereof in mines severely hampers rescue efforts in the event of emergencies.

(2) Mines, particularly underground mines, have properties that present unique technical challenges for the integration of currently available tracking and communications systems. These properties include the lack of a clear path or open air which is required for radio signals and WiFi. Additionally, because coal is an absorptive material, less than 10 percent of the radio spectrum that is used above ground can be used underground. A fraction of that (only about 1 percent) radio spectrum is actually allocated for commercial communications purposes. As a consequence, the availability of miner communication equipment is severely limited.

(3) Research and experience have shown that communications and tracking systems may not work equally well in every mine or in every emergency situation, and therefore several different systems may be necessary for development and integration.

(4) Because of the serious challenges of the mine environment and the limited market provided by the mining industry, much needed technology has not yet been developed by the private sector or is not commercially available in the United States.

(5) Furthermore, due to the regulatory structure of the industry and the lengthy approval process for mine tracking and communications systems, research must be accelerated so that next generation technology can be quickly and efficiently integrated into mines to protect the safety of miners.

(6) The National Institute of Standards and Technology is well positioned to help accelerate the development of mining tracking and communications technology. The National Institute of Standards and Technology has a long history of working in conjunction with industry to invest in longer-term, high-risk research which yields national benefits far beyond private payoff. Further, the National Institute of Standards and Technology builds partnerships with industry to leverage existing research and development to drive next generation technology.

(7) The National Institute of Standards and Technology is well-positioned to accelerate development of consensus mining communications standards given the extensive work that the organization has done in the field of emergency communications to develop standards and technologies for interoperable wireless telecommunications and information systems.

(8) In developing such standards, the National Institute of Standards and Technology should work in cooperation with the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration, and other relevant public and private stakeholders, to build on existing technology and knowledge regarding mine communications systems.

SEC. 3. MINE COMMUNICATIONS AND TRACKING RESEARCH AND DEVELOPMENT PROGRAM AUTHORIZATION.

(a) ESTABLISHMENT.—The Director of the National Institute of Standards and Technology shall provide for the establishment of a program of research, development, and demonstration that includes the establishment of best practices, adaptation of existing technology, and efforts to accelerate the development of next generation technology and tracking systems for mine communications.

(b) COORDINATION.—In carrying out this section, the Director shall coordinate with relevant Federal agencies and industry to evaluate areas of research and development and best practices that will be most promising in protecting miner safety.

(c) OPTIONAL FOCUS.—In establishing this program, the Director may focus on the following communications and tracking system characteristics:

(1) Systems that are likely to work in emergency situations.

(2) Systems that work in coal mines, with special attention paid to deep underground coal mines.

(3) Systems that provide coverage throughout all areas of the mine.

(4) Hybrid systems that use both wireless and infrastructure based systems.

(5) Functionality for 2-way and voice communications.

(6) Systems that serve emergency and routine communications needs.

(7) The ability to work with existing legacy systems and to be quickly integrated.

(8) Propagation environment characterization, performance metrics, and independently derived validation tests to verify performance for standards development.

SEC. 4. STANDARDS REGARDING UNDERGROUND COMMUNICATIONS.

The Director of the National Institute of Standards and Technology shall work with industry and relevant Federal agencies to develop consensus industry standards for communications in underground mines. The Director shall also develop and provide any needed measurement services to support implementation of these standards. In their efforts to help develop these standards and related measurement services, the following issues should be addressed:

(1) The appropriate use of frequency bands and power levels.

(2) Matters related to interoperability of systems, applications, and devices.

(3) Technology to prevent interference.

SEC. 5. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to the Director of the National Institute of Standards and Technology such sums as are necessary for carrying out this Act for fiscal years 2009 and 2010, to be derived from amounts authorized under section 3001 of the America COMPETES Act.

Amend the title so as to read:

A bill to require the Director of the National Institute of Standards and Technology to establish an initiative to promote the research, development, and demonstration of miner tracking and communications systems and to promote the establishment of standards and other measurement services regarding underground communications to protect miners in the United States.

II. PURPOSE OF THE BILL

The purpose of the bill is to authorize a research, development, and demonstration program at the National Institute of Standards and Technology (NIST) to accelerate the development of innovative mine communications and tracking technology; and to require the Director of NIST to work with industry and relevant Federal agencies to develop consensus standards and standard reference materials for communications in underground mines. The programs authorized in this bill are run by the National Institute for Standards and Technology.

III. BACKGROUND AND NEED FOR LEGISLATION

Over the past two years, several mine tragedies resulting in multiple deaths have shocked the Nation and have brought the issue of miner safety and health to the forefront. This series of tragedies started with the Sago mine explosion in West Virginia in 2006 and includes most recently the August 2007 disaster at the Crandall Canyon mine in Utah.

In 2006, the number of miner fatalities in United States mines amounted to 72, the highest number since 2001 and a sharp rise after years of progress in lowering these numbers. From January

through October of 2007, there have been 26 miner fatalities. The high number of fatalities has spurred a number of Congressional investigations as well as the passage of legislation targeted towards improving mine safety. These accidents, and particularly the most recent disaster at Crandall Canyon, highlighted the need for better tracking and communications capabilities, including devices that will work in the event of an emergency and will allow two-way communication.

On August 6, 2007, six miners were trapped more than eighteen hundred feet underground in the Crandall Canyon mine when rocks and debris exploded off the walls of the tunnels where they were working. During the rescue attempt that followed, further disaster struck when another underground explosion occurred, killing three rescuers.

This disaster resulted in the loss of nine lives with the whereabouts of six of those victims still unknown months after the accident. The lack of information about the exact location of the trapped miners resulted in a virtually impossible rescue and an excruciating ordeal for the families of the trapped miners. The lack of either tracking or two-way communications systems left rescuers with few options beyond blindly drilling through hundreds of feet of rock with the hopes of reaching survivors.

Recent mine collapses have emphasized the need for effective tracking of miners underground as well as the need for emergency communications between miners inside the mine and personnel outside the mine. Mines generally have reliable and effective communications systems that often include hard-wired networks, but these systems are often compromised during catastrophic events. Experience has shown that such technologies must function in post-disaster environments and enable two-way communication.

Beyond the threat that a catastrophic event could pose to the integrity of mine tracking and communications systems, mines have a number of unique characteristics that make implementing such systems even more difficult. These characteristics include physical forces, extreme temperatures, physical geometry and electromagnetic characteristics which together create a very difficult environment for effective signal propagation. These unique elements make implementation of many existing technologies virtually impossible and further add to the challenge of creating effective mine tracking and communications systems.

Underground mines have a dynamic structure, a continuously changing maze of mine openings which include entries and crosscuts, following the wave of a coal seam within the mountain. The overall size of mines can range from tens to hundreds of thousands of feet of entries, some interconnected and some with dead ends. This means that no mine has the same layout and that even within the same mine, the size of and distances between various openings can vary widely.

Two key measurements that impact communications systems include the line of sight distances between openings as well as the propagation paths through the mined out openings. The mine environment and the various distances between openings makes it more challenging for communications signals to be capable of traveling both long and short distances without interruption or corruption. Communications equipment is often not able to work in all

areas of the mine or certain areas of the mine may not be equipped with the appropriate technology to support the communications system.

Physical mine characteristics, including high humidity, the prevalence or rock and/or coal dust, in addition to the daily vibrations and shock within the mine all contribute to the difficulties in implementing and maintaining electrical systems. In addition, because miners could come into contact with potentially explosive levels of methane in various areas of the mine, all communications devices must be found to be intrinsically safe or enclosed in an explosion-proof enclosure and must be approved by the Mine Safety and Health Administration (MSHA). These constraints further limit the size and power source of communications and tracking devices that can be used by miners.

Additionally, radio signals require a clear path or open air for optimum signal propagation but mine pillars, ventilation access points and the natural path of the mine can impede or even completely block conventional radio signal propagation. Signal propagation is also impacted by radio frequency selection and the electrical properties of coal. Under certain conditions, very low frequency signals can penetrate though the strata, but carry limited information and require a large antenna above ground. Higher frequency signals carry more information, but require line of sight paths and are unable to travel from turn to turn underground.

Further research regarding underground communications and the applicability of existing technology to the underground mine environment is necessary in order to foster the development of next generation mine tracking and communications technology. Currently, communications for underground mines is unregulated and many necessary metrics and standards have not been developed in this niche field.

Through research in the field of underground communications, additional radio spectrum could potentially be made available underground, providing firms with a greater allocation for commercial communications purposes. The development of consensus standards for underground communication will help facilitate the development of innovative new technology in the field of underground mine communications.

Due to the relatively small market for mine communications products, many private sector firms do not have the capacity to invest in the necessary research, development and testing of mine communications technology. Because of the safety and other regulatory concerns associated with the mining industry, firms spend a significant amount of time waiting to gain approval for mine tracking and communications technology. Government-sponsored research and the development of consensus standards in this field would aid in the acceleration of next-generation technology to better protect underground miners.

As a technical agency with significant experience in developing consensus industry standards and providing measurement services to other industries, the National Institute for Standards and Technology (NIST) is well poised to assist in these tasks for the field of mine communications. NIST has a long history of working in close collaboration with industry to facilitate research and development in longer-term, high-risk research which will yield national

benefits. This research will have a clear national development in fostering the development of innovative technology that will protect the health and safety of American miners. In the accelerating the development of consensus industry standards and provision of measurement services, NIST will seek to address the appropriate use of frequency bands and power levels, issues related to interoperability and interference.

IV. COMMITTEE ACTIONS

On October 17, 2007, Representative Jim Matheson, for himself and Representative Bart Gordon, Chairman of the Committee on Science and Technology, Representative Ed Whitfield, Representative Mike Ross, Representative Geoff Davis, Representative Don Young, Representative Chris Cannon, Representative Spencer Bachus, and Representative Harold Rogers introduced H.R. 3877, the Mine Communications Technology Innovation Act, a bill to require the Director of the National Institute of Standards and Technology to establish an initiative to promote the research, development, and demonstration of miner tracking and communications systems and to promote the establishment of standards regarding underground communications to protect miners in the United States.

The full Committee on Science and Technology met to consider H.R. 3877, on Wednesday, October 24, 2007 and considered the following amendments to the bill:

1. Mr. Matheson offered an amendment to make technical and clarifying amendments to the bill and to make the following additional changes:

In Section 3(a), expands the purpose of the research program created in the bill so that it includes the establishment of best practices and the adaptation of existing technology for mine communications;

In Section 3(c), adds research on characterizing the radio propagation environment, performance metrics, and validation tests as focus areas for the program;

In Section 4, generalizes the specific requirement for NIST to develop standard reference materials to a broader requirement to develop any needed measurement services for mine communications technology.

The amendment was agreed to by a voice vote.

Mr. Lampson moved that the Committee favorably report the bill, H.R. 3877, as amended, to the House with the recommendation that the bill as amended do pass; that the staff be instructed to prepare the report and make necessary technical and conforming changes; and that the Chairman take all necessary steps to bring the bill before the House for consideration. The motion was agreed to by a voice vote.

Mr. Gordon moved that: (1) Members have two subsequent calendar days in which to submit supplemental, minority, or additional views on the measure; and (2) pursuant to clause 1 of rule 22 of the Rules of the House of Representatives, the Committee authorizes the Chairman to offer such motions as may be necessary in the House to adopt and pass H.R. 3877, the Mine Communications Technology Innovation Act, as amended.

V. SUMMARY OF MAJOR PROVISIONS OF THE BILL AS REPORTED

H.R. 3877 authorizes the National Institute of Standards and Technology (NIST) to establish a research, development, and demonstration project to accelerate the development of innovative communications and tracking technology for use in mines. This project will include the establishment of best practices and adaptation of existing technology. NIST is required to coordinate with relevant Federal agencies to determine research priorities, which may include emergency communications systems, systems for deep underground mines, hybrid wireless and infrastructure based systems, or other optional priorities.

The bill also requires NIST to work with industry and relevant Federal agencies to develop consensus standards for communications in mines. NIST is required to develop and provide measurement services in support of these standards.

The bill authorizes to NIST such sums as are necessary to carry out these programs for fiscal years 2009 and 2010, to be derived from amounts authorized to NIST in the America COMPETES Act (Public Law 110–69).

VI. SECTION-BY-SECTION ANALYSIS OF THE BILL AS REPORTED

Section 1. Short title

"Mine Communications Technology Innovation Act."

Sec. 2. Findings

Establishes Congressional findings that underground mines present unique communications challenges and existing communication technologies are inadequate for maintaining communications, especially in emergencies. Finds that the National Institute of Standards and Technology (NIST) is well positioned to support development of technology and technical standards to improve communications capabilities in mines in partnership with the National Institute for Occupational Health and Safety (NIOSH).

Sec. 3. Mine communications and tracking research and development program authorization

Requires the Director of NIST to establish a research, development, and demonstration program to accelerate the development of innovative mine communications and tracking technology, develop best practices, and adapt existing technology. Requires the Director to coordinate with other Federal agencies to determine research priorities for promoting miner safety. These priorities may include development of systems for emergency situations, systems for coal mines or deep underground mines, systems that provide ubiquitous coverage, hybrid wireless and wired systems, systems for use in both emergency and routine communications, and additional functionality for two-way and voice communications.

Sec. 4. Standards regarding underground communications

Requires the Director of NIST to work with industry and relevant Federal agencies to develop consensus standards and provide related measurement services for communications in underground mines. Requires NIST to address the issues of (1) the appropriate use of frequencies and power levels; (2) communications interoper-

ability; and (3) technology to prevent interference when developing standards and providing related measurement services.

Sec. 5. Authorization of appropriations

Authorizes such sums as are necessary for carrying out this Act for FY 2009 and FY 2010, to be derived from amounts authorized to NIST under section 3001 of the America COMPETES Act.

VII. COMMITTEE VIEWS

The Committee recognizes the urgent need to develop and implement improved communications technologies for use in mines during routine operation and emergencies. Mine-related accidents caused 234 deaths and nearly 40,000 injuries between 2000 and 2006. In many of those situations, improved communications technologies could have aided the rescue and recovery efforts by making miners easier to locate or conditions easier to assess. The Committee believes that the Federal government should accelerate efforts to support the development of innovative technologies and adaptation of existing technologies capable of providing communications services in mines, especially in emergency situations to protect the life and health of miners.

Underground mines present specific technical challenges that make traditional communications technology ineffective, especially in emergency situations. It is extremely difficult to lay infrastructure for traditional wired communications systems in mines, as new spaces are constantly being opened as mines expand, and equipment for installing infrastructure is not easily transportable into deep mines. In mines where this infrastructure does exist, it may be damaged and inoperative during emergency situations such as cave-ins. Existing wireless communications technology is also not adequately effective in mine environments. Open air pathways, which are required for radio signals and WiFi, do not exist in underground mines. Additionally, less than ten percent of the radio spectrum that is used for above ground communications can be used underground because of the physical properties of rock and coal. New technology supporting communications in spite of these challenges is urgently required to allow effective communication within mines and from mines to above ground emergency workers.

The Committee believes that the National Institute of Standards and Technology (NIST) is one of the key agencies to develop these new technologies, adapt existing technologies, and guide the creation of consensus standards and best practices to promote miner safety through effective communications. These activities fall specifically within NIST's stated mission, which is to promote innovation through technical standards development and research. NIST has a long record of successful collaborations with Federal agencies and industry to advance technology in a wide range of fields. The agency's ability to facilitate decision-making among stakeholders and provide expert technical assistance will ensure that new, effective technologies are implemented in the most efficient manner possible.

The federal agencies that have responsibility for mine safety, including the National Institute of Occupational Safety and Health (NIOSH) and the Mine Health and Safety Administration (MHSA), have previously turned to NIST for assistance in specific technical

areas. For example, one of MHSA's responsibilities is monitoring the hearing of miners, who are often exposed to loud noises that can cause significant hearing damage. MHSA employs noise dosimeters worn by miners for this purpose, and the accuracy of the dosimeters is ensured with a calibration process that is conducted by NIST's Manufacturing Engineering Laboratory (MEL). NIST also conducted technical collaborations with the former U.S. Bureau of Mines to develop software for robotic mining systems, which can protect mine workers by reducing the need for them to operate in dangerous or difficult mine areas. The Committee expects that NIST's activities will be complementary and not redundant to ongoing work at NIOSH.

The Committee believes that NIST should leverage its existing lab capabilities to implement the research, development and demonstration projects authorized in this legislation. Additionally, when appropriate, NIST should work with outside researchers through grants or other mechanisms to take advantage of the expertise of scientists with a background in mine-related fields or advanced communications. For the purpose of guiding standards development, NIST should be certain to include the National Institute of Occupational Safety and Health (NIOSH) so as to take advantage of that agency's expertise in the area of mine safety generally. Additionally, NIST should work closely with NIOSH to ensure that their respective research portfolios are complementary in terms of priorities and activities.

NIST has specific expertise in the field of communications technology that is highly applicable to the challenges of communications in underground mines. The Electronics and Electrical Engineering Laboratory (EEEL) at NIST carries out research and develops standard reference materials related to wireless communication. The Information Technology Laboratory (ITL) and the Building and Fire Research Laboratory (BFRL) are also involved in the wireless communications program. Currently, NIST has an active research program in radio communications for first responders in difficult radio environments, such as demolished buildings. NIST researchers have conducted field tests of first-responder radios inside demolished buildings, and results from these tests show that it is possible to detect radio and cell-phone signals from inside collapsed buildings, but only with special equipment and under certain conditions. NIST is also working with the Department of Homeland Security's Science and Technology Directorate to develop comprehensive standards for urban-environment search & rescue (USR) robots, including standards for radio communication with robots in tunnels. NIST is developing new technical approaches to radio communication and locating first responders and victims based on the results of these experiments. The conditions in these research projects present similar challenges to those that exist in mines, and the results of this research are a valuable starting point for innovations in the field of mine communications technology.

VIII. COST ESTIMATE

A cost estimate and comparison prepared by the Director of the Congressional Budget Office under section 402 of the Congressional Budget Act of 1974 has been timely submitted to the Committee on Science and Technology prior to the filing of this report and is in-

cluded in Section X of this report pursuant to House Rule XIII, clause 3(c)(3).

H.R. 3877 does not contain new budget authority, credit authority, or changes in revenues or tax expenditures. Assuming that the sums authorized under the bill are appropriated, H.R. 3877 does authorize additional discretionary spending, as described in the Congressional Budget Office report on the bill, which is contained in Section X of this report.

IX. CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

OCTOBER 26, 2007.

Hon. BART GORDON,
Chairman, Committee on Science and Technology,
House of Representatives, Washington, DC.

DEAR MR. CHAIRMAN: The Congressional Budget Office has prepared the enclosed cost estimate for H.R. 3877, the Mine Communications Technology Innovation Act.

If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contact is Susan Willie.

Sincerely,

PETER R. ORSZAG.

Enclosure.

H.R. 3877—Mine Communications Technology Innovation Act

H.R. 3877 would establish a research and development program at the National Institute of Standards and Technology (NIST) to develop communications systems for underground mines. The program would focus on identifying existing methods that have been effective, adapting existing technology, and encouraging technological innovation in such communication systems. NIST, working with the mining industry and other federal agencies, also would be required to develop industry-wide standards for communication in underground mines.

Based on information from NIST, CBO estimates that implementing the provisions of H.R. 3877 would cost about $1 million over the 2008–2012 period, subject to appropriation of the amounts authorized to be appropriated to NIST in the America COMPETES Act. Enacting H.R. 3877 would not affect direct spending or revenues.

H.R. 3877 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act and would not affect the budgets of state, local, or tribal governments.

The CBO contact for this estimate is Susan Willie. This estimate was approved by Theresa Gullo, Deputy Assistant Director for Budget Analysis.

X. COMPLIANCE WITH PUBLIC LAW 104–4

H.R. 3877 contains no unfunded mandates.

XI. COMMITTEE OVERSIGHT FINDINGS AND RECOMMENDATIONS

The oversight findings and recommendations of the Committee on Science and Technology are reflected in the body of this report.

XII. STATEMENT ON GENERAL PERFORMANCE GOALS AND OBJECTIVES

Pursuant to clause (3)(c) of House rule XIII, the goals of H.R. 3877 are to . . .

XIII. CONSTITUTIONAL AUTHORITY STATEMENT

Article I, section 8 of the Constitution of the United States grants Congress the authority to enact H.R. 3877.

XIV. FEDERAL ADVISORY COMMITTEE STATEMENT

No Federal Advisory Committees are created by H.R. 3877.

XV. CONGRESSIONAL ACCOUNTABILITY ACT

The Committee finds that H.R. 3877 does not relate to the terms and conditions of employment or access to public services or accommodations within the meaning of section 102(b)(3) of the Congressional Accountability Act (Public Law 104–1).

XVI. EARMARK IDENTIFICATION

H.R. 3877 does not contain any congressional earmarks, limited tax benefits, or limited tariff benefits as defined in clause 9(d), 9(e), or 9(f) of rule XXI.

XVII. STATEMENT ON PREEMPTION OF STATE, LOCAL, OR TRIBAL LAW

This bill is not intended to preempt any state, local, or tribal law.

XVIII. CHANGES IN EXISTING LAW MADE BY THE BILL, AS REPORTED

None.

XIX. COMMITTEE RECOMMENDATIONS

On October 24, 2007, the Committee on Science and Technology favorably reported the Mine Communications Technology Innovation Act by a voice vote, and recommended its enactment.

ADDITIONAL VIEWS OF REPRESENTATIVES RALPH HALL, PHIL GINGREY, VERNON EHLERS, MICHAEL MCCAUL, TOM FEENEY AND ADRIAN SMITH

Although Members on the minority side supported the bill offered in Committee, Members expressed concern with the language directing that funding for this bill come from the funds authorized for the COMPETES Act of 2007 (Public Law 110–69). Retroactively authorizing programs through previously authorized legislation sets a questionable precedent for future programs to be authorized in a similar manner.

Members expressed reservations that this practice could hamper the agencies enumerated in COMPETES which have long suffered declining or stagnant budgets. The purpose of the COMPETES Act was to increase America's competiveness and innovation capacity. It is not clear that this bill directly achieves that purpose. Members trust that this will not begin a precedent of redirecting funding intended for these programs whenever a new bill requires an authorization.

RALPH M. HALL.
VERNON J. EHLERS.
PHIL GINGREY.
MICHAEL T. MCCAUL.
TOM FEENEY.
ADRIAN SMITH.

XXI. PROCEEDINGS OF THE FULL COMMITTEE MARKUP ON H.R. 3877, THE MINE COMMUNICATIONS TECHNOLOGY INNOVATION ACT

WEDNESDAY, OCTOBER 24, 2007

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
Washington, DC.

The Committee met, pursuant to call, at 10:10 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Bart Gordon [Chairman of the Committee] presiding.

Chairman GORDON. Good morning. The Committee will come to order, pursuant to notice. The Committee of Science and Technology meets to consider the following measures: H.R. 2406, *To authorize the National Institute of Standards and Technology to Increase its efforts in support of the integration of health care information enterprises in the United States;* H.R. 3877, the *Mine Communications Technology Innovation Act;* and H.R. 1834, the *National Ocean Exploration Program Act.*

As we start, let me welcome back Mike Quear. Mike is the brains and the inspiration for, particularly the health care bit of this. As we pointed out the other day, Mr. Hall was very complimentary; Mike had a stroke recently, complicated by some other matters. He is back, and we are glad you are here, Mike. You are very important to the entire Committee.

We now proceed with the markup, and I will begin with a brief statement. Today the Committee meets to markup three bills dealing with a wide range of issues.

The first bill we will markup, H.R. 2406, deals with the issue of health care information technology. The broad use of IT in the health care sector could have far reaching benefits, including saving tens of billions of dollars per year—and that is tens of billions of dollars for both the taxpayers as well as for patients—improving the quality of medical care, and reducing dangerous medical errors.

But meeting the challenge of developing and maintaining such a system is not simple. In order to achieve broad implementation, we need widely accepted technical standards that will let health care IT systems inter-operate while protecting patient privacy.

H.R. 2406 authorizes the National Institute of Standards and Technology to increase its efforts to support the integration of health care IT in the United States, to develop or adapt or adopt existing technical health care IT standards for federal agencies, and to create a university grant program for multi-disciplinary research in health care IT—and I thank Mr. Wu for that addition. The bill is based on the recommendations of a report by the Presi-

dent's Information Technology Advisory Committee in 2004 and a study by the National Academies in 2005.

The next bill we will markup is H.R. 3877, which addresses the issue of underground mine communication technology.

Tragedies in West Virginia and Utah over the last few years have given us a painful illustration for the need for robust emergency communications in mines.

H.R. 3877 authorizes research and standards development programs to address the important challenge of communication technology for underground mines. The bill authorizes an R&D and standards development program at the National Institute of Standards and Technology at NIST to promote development of innovative communications and tracking technologies of underground mines.

To be clear, this bill has not, in any way, diminished the role of the National Institute for Occupational Safety and Health. NIST's efforts to promote improved communications technology through R&D and technical standards only support NIOSH's important work. And I want to thank Mr. Matheson for bringing this very important and timely issue to us.

The *National Ocean Exploration and National Undersea Research Program Act* formally authorizes two programs at NOAA that have made important contributions to our knowledge of the oceans and developed technologies that enable us to explore these vast areas of our planet.

Once again the Committee has three good bills in front of it, which do address three different, but critical issues.

And once again, we are marking up both Republican and Democratic bills, because as I have said before, good ideas are good ideas, regardless of where they might originate. And I urge my colleagues to support each of these good bills.

I now recognize Mr. Hall to present his opening remarks.

[The prepared statement of Chairman Gordon follows:]

PREPARED STATEMENT OF CHAIRMAN BART GORDON

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But meeting the challenge of developing and maintaining such a system is not simple. In order to achieve broad implementation, we need widely accepted technical standards that will let health care IT systems inter-operate while protecting patient privacy.

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tute of Standards and Technology (NIST) to promote development of innovative communications and tracking technologies for underground mines.

To be clear, this bill does not in any way diminish the role of the National Institute for Occupational Safety and Health (NIOSH). NIST's efforts to promote improved communications technology through R&D and technical standards support NIOSH's important work.

Historically, NIST has worked with industry and federal agencies on long- term R&D projects and development of technical standards, including first responder radio communications, and is the best agency to bridge the research and technology gap in the field of mine communications.

Finally, we will also consider H.R. 1834, introduced by our colleague on the Natural Resources Committee, Rep. Saxton. The *National Ocean Exploration and National Undersea Research Program Act* formally authorizes two programs at NOAA that have made important contributions to our knowledge of the oceans and developed technologies that enable us to explore these vast areas of our planet.

Once again the Committee has three good bills in front of it which address three different, but critical issues.

And once again, we are marking up both Republican and Democratic bills, because as I have said before, good ideas are good ideas regardless of where they come from. I urge my colleagues to support each of these good bills.

Mr. HALL. Thank you, Mr. Chairman. As you very ably pointed out, I am pleased, and our side of the docket is pleased that this committee is marking up three good bills today.

H.R. 2406 will certainly help clarify and codify NIST's role in the integration of health information technology. NIST has played a very important role in health information technology through their work with the Department of Health and Human Services, and this legislation helps them to continue that vital role as we develop inter-operability standards.

H.R. 3877 offers another opportunity to clarify NIST's role in the important area of mine communication technology. AS the tragedy in Utah unfortunately illustrated, we have a lot of work to do to improve communications between surface personnel and underground miners so as to advance miner health and safety.

And finally, H.R. 1834 authorizes two programs that are already in existence at NOAA, the Ocean Exploration Program and the National Undersea Research Program. These are two excellent initiatives, and it is time that we codify their goals and objections into law.

I would like to thank you and your staff for working with us to improve these bills and craft good policy.

I yield back the balance of my time.

[The prepared statement of Mr. Hall follows:]

PREPARED STATEMENT OF REPRESENTATIVE RALPH M. HALL

Thank you, Mr. Chairman. I am pleased that this committee is marking up three good bills today. H.R. 2406 will help clarify and codify NIST's role in the integration of health information technology. NIST has played an important role in health information technology through their work with the department of health and human services, and this legislation helps them continue that vital role as we develop interoperability standards.

H.R. 3877 offers another opportunity to clarify NIST's role in the important area of mine communications technology. As the tragedy in Utah unfortunately illustrated, we have a lot of work to do to improve communications between surface personnel and underground miners so as to advance miner health and safety.

Finally, H.R. 1834 authorizes two programs that are already in existence at NOAA, the Ocean Exploration Program and the National Undersea Research Program. These are two excellent initiatives, and it is time that we codify their goals and objectives into law.

I would like to thank you and your staff for working with us to improve these bills and craft good policy.

I yield back the balance of my time.

Chairman GORDON. Thank you, Mr. Hall.

Without objection, Members may place statements in the records at any point.

[The prepared statement of Mr. Mitchell follows:]

PREPARED STATEMENT OF REPRESENTATIVE HARRY E. MITCHELL

Thank you, Mr. Chairman.

As you know, our nation is facing a health care crisis. And I'm not even talking about the rising cost. We have an information crisis. Different information is stored in different systems, and too often we have to jump through hoops do share it. We have yet to get vital health information stored in one uniform system.

The inability to share health information puts patient care at risk. According to the Institute of Medicine, as many as 98,000 people die in hospitals yearly from medical errors such as improper medications and incorrect diagnoses, and as much as 49 percent of diagnostic testing is replicated because previous tests results are not readily accessible.

In addition to the honor of serving on this committee, I have the honor of serve as Chairman of the Veterans' Affairs Committee's Subcommittee on Oversight and Investigations. In the course of our work there, we have seen serious problems with medical information sharing between the Department of Defense and the Veterans Administration. Veterans are finding technological and bureaucratic hurdles when they try to access their own medical histories. This puts their medical care at risk, and I think our nation's heroes deserve better.

I am pleased with the work that the Science and Technology Committee has dome to help create a solution to this long vexing problem. I am a proud co-sponsor of H.R. 2406, and I am confident that this legislation will establish the technical standards necessary to ensure secure and accurate health care information sharing between federal agencies like the DOD and the VA.

I yield back.

Chairman GORDON. We now consider H.R. 3877, the *Mine Communications Technology Innovation Act.* I yield to the gentleman from Utah, Mr. Matheson, five minutes to describe his bill.

Mr. MATHESON. Well, thank you, Chairman Gordon, and I also want to thank both you and Ranking Member Hall for your help on this matter.

This legislation is very important to me because I have been working on at the aftermath of the disaster at the Crandall Canyon Mine, which is in my congressional district. I think we all remember it was on August 6 that six miners were trapped when rocks and debris exploded off the walls of the tunnels where they were working, more than 18,000 feet underground. During the rescue attempt that followed, further disaster struck when underground activity caused a burst of rubble to explode off the cavern wall, and that killed three rescuers at the time.

Now, one of the most difficult aspects of the Crandall Canyon Mine collapse was not knowing where the trapped miners were when the cave-in occurred. It made for an excruciating ordeal for the families, the mine owner and the mine rescuers. I think everyone in this room, if you watched on television, you remember that there is this frustrating scenario where multiple holes are being drilled down from the surface, but it was clear that it wasn't known exactly where the trapped miners were, and each hole, as it was drilled, won't find any sign of the miners.

And I think a lot of us felt frustration at the time about thinking we can communicate and get images from the surface of Mars, but we can't seem to get communication to establish where there miners are undergrounds. Mines generally have reliable communica-

tions systems in place, but most mines have properties that make implementation of current technology difficult. The problem is the open-air pathway required for radio signals and WiFi do not exist, and less than 10 percent of the radio spectrum used above ground can be used underground.

Because of the challenges of the mine environment and the limited nature of the market, much needed technology has not been developed or is not commercially available, so the purpose of this legislation is to accelerate the development of innovate next-generation mine tracking and communication technology. My legislation directs the National Institute of Standards and Technology to establish an initiative to promote the research, development, and demonstration of miner tracking and communications systems and to promote the establishment of standards and other measurement services regarding underground mines.

As the Chairman indicated in his remarks at the start of this hearing, this is a narrowly targeted R&D bill. It does not infringe on other committees' jurisdictions in the House when it comes to mine safety issues. I think it is a critical issue that ought to be addressed in order to better protect our miners.

And again, both Mr. Chairman and Ranking Member Hall, I thank you for your cooperation on this, and I will yield back my time.

[The prepared statement of Mr. Matheson follows:]

PREPARED STATEMENT OF REPRESENTATIVE JIM MATHESON

Thank you, Chairman Gordon and Ranking Member Hall.

I thank both of you for your willingness to consider H.R. 3877, the *Mine Communications Technology Innovation Act.* This legislation is very near to my heart and is something that I have been working on in the aftermath of the disaster at Crandall Canyon Mine which is in my district.

On August 6, six miners were trapped when rocks and debris exploded off the walls of the tunnels where they were working, more than eighteen hundred feet underground. During the rescue attempt that followed, further disaster struck when underground activity caused a burst of rubble to explode off the cavern wall, killing three rescuers.

One of the most difficult aspects of the Crandall Canyon mine collapse was not knowing where the trapped miners were when the cave-in occurred. It made for an excruciating ordeal for the families, the mine owner and the mine rescuers. The lack of communications left the rescuers with the frustrating scenario of trying to drill blindly through hundreds of feet of rock with the hope of reaching survivors.

While mines generally have reliable communications systems in place, most mines have properties that make implementation of current technology difficult. For example, the open air pathway required for radio signals and WiFi do not exist and less than ten percent of the radio spectrum used above ground can be used underground. Because of the challenges of the mine environment and the limited nature of the market, much needed technology has not yet been developed or is not commercially available.

The purpose of this legislation is to accelerate the development of innovative, next generation mine tracking and communications technology. My legislation directs the National Institute of Standards and Technology to establish an initiative to promote the research, development, and demonstration of miner tracking and communications systems and to promote the establishment of standards and other measurement services regarding underground mines.

This is a critical issue that must be addressed in order to better protect our miners and I thank you Mr. Chairman for your consideration of this legislation. Thank you, Mr. Chairman.

Chairman GORDON. Thank you Mr. Matheson. I recognize Mr. Hall to present any remarks.

Mr. HALL. Mr. Chairman, I would like to thank you and your staff for taking some time to sit down and to work on a manager's amendment to this bill.

There is a clear agreement that NIST has the expertise needed to draft standards for communication equipment in mines and other subterranean environments and foster development of those systems through best practices of measurement services and research evaluations. This bill as amended would substantially contribute to the health and safety of miners. Specifically, NIST has long been a leader in communications research technology and has the equipment and expertise to characterize the mine environment and determine what techniques are best suited for these difficult conditions.

However, many Members of the Committee and I were concerned that the bill, as introduced, went beyond NIST's core competencies to include technology development activities beyond their scope and duplicative of efforts currently underway at NIOSH. Under the 2006 *Miner Act,* NIOSH has received significant funding to lead an interagency program to develop communication, tracking, oxygen supply, and refuge systems for mines. And to date, this program has invested over $23 million and is steadily progressing toward installation of new safer communication systems in 2009.

And it is my understanding that the manager's amendment ensures that any activity undertaken by NIST will complement the large effort already underway at NIOSH. And while I am pleased with the manager's amendment, I do believe this committee could have crafted an even better bill if we had been given the time necessary to craft this legislation by the regular order.

While I realize that time is not in an overabundant supply in these halls at this time, and the Chair has reason to move this bill quickly to the Floor, it is my hope that this will be an exception to the rule of carefully considering and wisely disseminating legislation from this committee.

And the policy in this amended bill, however, is one I hope the entire Committee can support. The bill creates a basic framework to ensure that the government's research agencies work cooperatively, effectively, and quickly to improve mine safety. And the world-renown capability of the NIST laboratories can significantly improve implementation of emergency communications and tracking systems in mines, and I do support passage of the amended bill today.

I yield back my time, sir.

Chairman GORDON. Thank you, Mr. Hall. Well, let me say that your thoughtful, constructive comments were certainly noted, and you, I think, were correct.

Does anyone else wish to be recognized?

Mr. Chandler.

Mr. CHANDLER. Thank you, Mr. Chairman.

I just want to compliment Mr. Matheson on bringing this matter to the Committee and passing this—hopefully passing this bill. The mine tragedy in Utah was just another on in a long line of mine tragedies in this country. We have experience the same sort of thing in my home State of Kentucky, and I believe that we ought to do everything in our power to protect our miners.

This is an effort to do it. Communications are vital, and I applaud and Mr. Matheson and the Chairman and the Ranking Member for moving on this thing. Thank you.

Chairman GORDON. Does anyone else wish to be recognized?

Dr. Gingrey.

Mr. GINGREY. Mr. Chairman, thank you, and I echo the sentiments expressed by Mr. Hall in regard to some of his concerns about regular order, but let me just compliment the gentleman from Utah. His heart is in the right place, no question about it. The gentleman from Kentucky knows of what he speaks, and if we had a Member here from West Virginia, I am sure they would echo those same sentiments.

So we understand from this side. While we like regular order, and would like to have had a little bit more time, but in this particular instance, time is of the essence, and so I commend Mr. Matheson for the bill, and I certainly support it.

Chairman GORDON. Does anyone else wish to comment on the bill? All right, again, Mr. Matheson, this bill is going to save lives and heartache for a lot of families. Thank you for bringing this to us.

I ask unanimous consent that the bill is considered as read and open to amendment at any point and that the Members proceed with the amendments in the order of the roster.

Without objection—excuse me. The first amendment on the roster is the manager's amendment, offered by the gentleman from Utah, Mr. Matheson. Are you prepared with your amendment?

Mr. MATHESON. Yes, Mr. Chairman, I am. Thank you.

Chairman GORDON. The Clerk will report the amendment.

The CLERK. Amendment to H.R. 3877, offered by Mr. Matheson of Utah.

Chairman GORDON. I ask unanimous consent to dispense with the reading. Without objection, so ordered.

I recognize the gentleman from Utah for five minutes to explain his amendment.

Mr. MATHESON. Well, thank you, Mr. Chairman. In the tradition of this committee, working in close consultation with both Majority and Minority staff, we drafted a manager's amendment that I think better defines the purpose of this research program to fit within NIST's set of core competencies.

Very briefly, these changes include the establishment of best practices, adaptation of existing technology for mine communication, and measurement services for mine communication. Additionally, this amendment clarifies that NIST is well positioned to accelerate the development of consensus standards, rather than draft those standards.

The amendment includes several other technical changes and does not make any changes to authorization language.

Again, I think the cooperation on both sides of the aisle on developing this manager's amendment. I urge its adopting, and I will yield back my time.

[The prepared statement of Mr. Matheson follows:]

PREPARED STATEMENT OF REPRESENTATIVE JIM MATHESON

Thank you, Chairman Gordon.

Working in close consultation with the Majority and Minority staff of the Science Committee, we drafted a manager's amendment that expands the purpose of this research program to better fit within NIST's set of core competencies.

These changes include the establishment of best practices, adaptation of existing technology for mine communication and measurement services for mine communications. Additionally, this amendment clarifies that NIST is well-positioned to accelerate the development of consensus standards, rather than draft those standards. The amendment includes several other technical changes and does not make any changes to authorization language.

Background Summary of Manager's Amendment to H.R. 3877

Major changes in the manager's amendment:

- Expands the purpose of the research program created in the bill so that it includes the establishment of best practices and the adaptation of existing technology for mine communications; and adds research on characterizing the radio propagation environment, performance metrics, and validation tests as focus areas for the program.
- Generalizes the specific requirement for NIST to develop standard reference materials to a broader requirement to develop any needed measurement services for mine communications technology.

Minor changes in the manager's amendment:

- Modifies the title of the bill to include other measurement services for mine communications technology.
- Changes the findings to note that NIST is well-positioned to accelerate the development of consensus standards for mine communications technology rather than to draft those standards.
- Adds language to the findings that NIST should work with other relevant public and private stakeholders on mine communications technology in addition to NIOSH and the Mine Safety and Health Administration.
- Includes best practices for mine communications technology in the list of areas on which NIST shall coordinate with other federal agencies.

THIS BILL DOES NOT MAKE ANY CHANGES TO PAYGO.

Chairman GORDON. Is there further discussion on the amendment? If no, the votes occurs on the amendment. All in favor, say aye; those opposed, no. The ayes have it. The amendment is agreed to.

Are there other amendments? If no, then the vote occurs on the bill H.R. 3877, as amended. All those in favor, say aye; opposed, no. In the opinion of the Chair, the ayes have it.

Mr. LAMPSON. Mr. Chairman, I move that the Committee favorably report H.R. 3877, as amended, to the House with the recommendation that the bill do pass. Furthermore, I move that the staff be instructed to prepare the legislative report and make necessary technical and conforming changes and that the Chairman take all necessary steps to bring the bill before the House for consideration.

Chairman GORDON. The question is on the motion to report the bill favorably. Those in favor of the motion will signify by saying aye; opposed, no. The ayes have it, and the bill is favorably reported.

Without objection, the motion to reconsider is laid upon the desk. Members will have two subsequent calendar days in which to submit supplement Minority or additional views on the measure, ending Monday, October the 29th at 9:00 a.m.

I move, pursuant to Clause 1 of Rule 22 of the Rules of the House of Representatives that the Committee authorize the Chairman to offer such motions as may be necessary in the House to

adopt and pass H.R. 3877, the *Mine Communications Technology Innovation Act,* as amended. Without objection, so ordered.

Let me say to the Members, this appears to be our last markup of this year. I thank you for your attendance. I think this is probably a record year, and we want to do more than just have numbers. We want to have good content, too, and this is 30-something bills, all of which have been bipartisan. All but one had been unanimous. I thank you for your cooperation, and let us continue next year in the same way.

This concludes this markup——

Mr. LAMPSON. Mr. Chairman, just may I before you end, just commend you for the leadership that you have provided to this committee. It has been excellent. It is great to work with you, and I think this is a wonderful committee to be a part of. Thank you so much.

Chairman GORDON. Thank you.

Mr. LAMPSON. And the staff.

Chairman GORDON. I was going to say, it helps to have excellent staff. And we do. Thank you very much.

[Whereupon, at 11:18 a.m., the Committee was adjourned.]

Appendix:

H.R. 3877, Section-by-Section Analysis, Amendment Roster

I

110TH CONGRESS
1ST SESSION

H. R. 3877

To require the Director of the National Institute of Standards and Technology to establish an initiative to promote the research, development, and demonstration of miner tracking and communications systems and to promote the establishment of standards regarding underground communications to protect miners in the United States.

IN THE HOUSE OF REPRESENTATIVES

OCTOBER 17, 2007

Mr. MATHESON (for himself, Mr. GORDON of Tennessee, Mr. WHITFIELD, Mr. ROSS, Mr. DAVIS of Kentucky, Mr. YOUNG of Alaska, Mr. CANNON, Mr. BACHUS, and Mr. ROGERS of Kentucky) introduced the following bill; which was referred to the Committee on Science and Technology

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A BILL

To require the Director of the National Institute of Standards and Technology to establish an initiative to promote the research, development, and demonstration of miner tracking and communications systems and to promote the establishment of standards regarding underground communications to protect miners in the United States.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Mine Communications Technology Innovation Act".

SEC. 2. FINDINGS.

Congress finds the following:

(1) The failure of miner tracking and communications devices or lack thereof in mines severely hampers rescue efforts in the event of emergencies.

(2) Mines, particularly underground mines, have properties that present unique technical challenges for the integration of currently available tracking and communications systems. These properties include the lack of a clear path or open air which is required for radio signals and WiFi. Additionally, because coal is an absorptive material, less than 10 percent of the radio spectrum that is used above ground can be used underground. A fraction of that (only about 1 percent) radio spectrum is actually allocated for commercial communications purposes. As a consequence, the availability of miner communication equipment is severely limited.

(3) Research and experience have shown that communications and tracking systems may not work equally well in every mine or in every emergency situation, and therefore several different systems may be necessary for development and integration.

(4) Because of the serious challenges of the mine environment and the limited market provided by the mining industry, much needed technology has

not yet been developed by the private sector or is not commercially available in the United States.

(5) Furthermore, due to the regulatory structure of the industry and the lengthy approval process for mine tracking and communications systems, research must be accelerated so that next generation technology can be quickly and efficiently integrated into mines to protect the safety of miners.

(6) The National Institute of Standards and Technology is well positioned to help accelerate the development of mining tracking and communications technology. The National Institute of Standards and Technology has a long history of working in conjunction with industry to invest in longer-term, high-risk research which yields national benefits far beyond private payoff. Further, the National Institute of Standards and Technology builds partnerships with industry to leverage existing research and development to drive next generation technology.

(7) The National Institute of Standards and Technology is well-positioned to draft mining communications standards given the extensive work that the organization has done in the field of emergency communications to develop standards and tech-

nologies for interoperable wireless telecommunications and information systems.

(8) In developing such standards, the National Institute of Standards and Technology should work in cooperation with the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration to build on existing technology and knowledge regarding mine communications systems.

SEC. 3. MINE COMMUNICATIONS AND TRACKING RESEARCH AND DEVELOPMENT PROGRAM AUTHORIZATION.

(a) ESTABLISHMENT.—The Director of the National Institute of Standards and Technology shall provide for the establishment of a program of research, development, and demonstration, that includes the availability of grants where appropriate, to accelerate the development of next generation mine communications and tracking technology systems.

(b) COORDINATION.—In carrying out this section, the Director shall work with relevant Federal agencies and industry to evaluate areas of research and development that will be most promising in protecting miner safety.

(c) OPTIONAL FOCUS.—In establishing this program, the Director may focus on the following communications and tracking system characteristics:

(1) Systems that are likely to work in emergency situations.

(2) Systems that work in coal mines, with special attention paid to deep underground coal mines.

(3) Systems that provide coverage throughout all areas of the mine.

(4) Hybrid systems that use both wireless and infrastructure based systems.

(5) Functionality for 2-way and voice communications.

(6) Systems that serve emergency and routine communications needs.

(7) The ability to work with existing legacy systems and to be quickly integrated.

SEC. 4. STANDARDS REGARDING UNDERGROUND COMMUNICATIONS.

The Director of the National Institute of Standards and Technology shall work with industry and relevant Federal agencies to develop consensus industry standards and standard reference materials for wireless communications in underground mines. In their efforts to help de-

velop these standards and reference materials, the following issues should be addressed:

(1) The appropriate use of frequency bands and power levels.

(2) Matters related to interoperability of systems, applications, and devices.

(3) Technology to prevent interference.

SEC. 5. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to the Director of the National Institute of Standards and Technology such sums as are necessary for carrying out this Act for fiscal years 2009 and 2010, to be derived from amounts authorized under section 3001 of the America COMPETES Act.

○

SECTION-BY-SECTION ANALYSIS OF

H.R. 3877, MINE COMMUNICATIONS TECHNOLOGY INNOVATION ACT

Sec. 1: Short Title.

"Mine Communications Technology Innovation Act"

Sec. 2: Findings.

Establishes Congressional findings that underground mines present unique communications challenges and existing communication technologies are inadequate for maintaining communications, especially in emergencies. Finds that the National Institute of Standards and Technology (NIST) is well positioned to support development of technology and technical standards to improve communications capabilities in mines in partnership with the National Institute for Occupational Safety and Health (NIOSH).

Sec. 3: Mine Communications and Tracking Research and Development Program Authorization.

Requires the Director of NIST to establish a research, development, and demonstration program to accelerate the development of innovative mine communications and tracking technology. Requires the Director to coordinate with other federal agencies to determine research priorities for promoting miner safety. These priorities may include development of systems for emergency situations, systems for coal mines or deep underground mines, systems that provide ubiquitous coverage, hybrid wireless and wired systems, systems for use in both emergency and routine communications, and additional functionality for two-way and voice communications.

Sec. 4. Standards Regarding Underground Communications.

Requires the Director of NIST to work with industry and relevant federal agencies to develop consensus standards and standard reference materials for wireless communications in underground mines. Requires NIST to address the issues of (1) the appropriate use of frequencies and power levels; (2) communications inter-operability; and (3) technology to prevent interference when developing standards and standard reference materials.

Sec. 5. Authorization of Appropriations.

Authorizes such sums as are necessary for carrying out this Act for FY 2009 and FY 2010, to be derived from amounts authorized to NIST under section 3001 of the *American Competes Act.*

COMMITTEE ON SCIENCE AND TECHNOLOGY
FULL COMMITTEE MARKUP
OCTOBER 24, 2007

AMENDMENT ROSTER

H.R. 3877, Mine Communications Technology Innovation Act

No.	Sponsor	Description	Results
1	Mr. Matheson	Manager's amendment expands the purpose of the research program created in the bill so that it includes the establishment of best practices and the adaptation of existing technology for mine communications; adds research on characterizing the radio propagation environment, performance metrics, and validation tests as focus areas for the program, and generalizes the specific requirement for NIST to develop standard reference materials to a broader requirement to develop any needed measurement services for mine communications technology.	Passed by voice vote.

AMENDMENT TO H.R. 3877

OFFERED BY MR. MATHESON OF UTAH

Page 3, line 21, strike "draft" and insert "accelerate development of consensus".

Page 4, line 7, insert ", and other relevant public and private stakeholders," after "Health Administration".

Page 4, lines 13 through 19, amend subsection (a) to read as follows:

(a) ESTABLISHMENT.—The Director of the National Institute of Standards and Technology shall provide for the establishment of a program of research, development, and demonstration that includes the establishment of best practices, adaptation of existing technology, and efforts to accelerate the development of next generation technology and tracking systems for mine communications.

Page 4, line 21, strike "work" and insert "coordinate".

Page 4, line 22, insert "and best practices" after "research and development".

Page 5, after line 17, insert the following new paragraph:

(8) Propagation environment characterization, performance metrics, and independently derived validation tests to verify performance for standards development.

Page 5, line 23, strike "and standard reference materials for wireless" and insert "for".

Page 5, line 24, insert "The Director shall also develop and provide any needed measurement services to support implementation of these standards." after "underground mines.".

Page 6, line 1, strike "reference materials" and insert "related measurement services".

Amend the title so as to read: "A Bill to require the Director of the National Institute of Standards and Technology to establish an initiative to promote the research, development, and demonstration of miner tracking and communications systems and to promote the establishment of standards and other measurement services regarding underground communications to protect miners in the United States.".